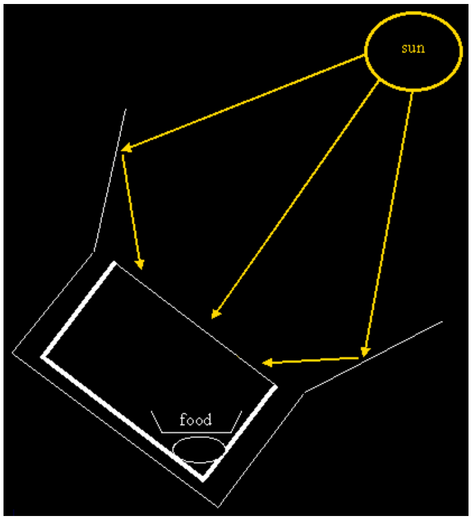
Why conventional Greenhouse Theory Violates the 1st Law of Thermodynamics

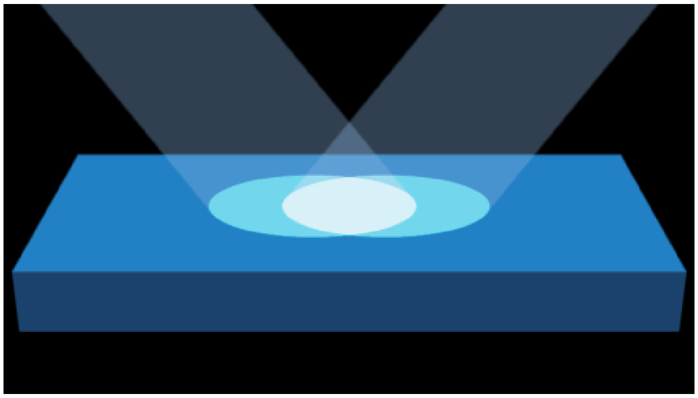
"One is disturbed each day by verifiably untrue statements touted as incontrovertible facts about hot-button issues." — **Richard S. Lindzen**

"CO_2 absorbs in the infrared and reradiates heat downward, thus heating the earth." — **Richard S. Lindzen**

Okay then, let's examine that particular "incontrovertible fact." You know how a solar oven works.



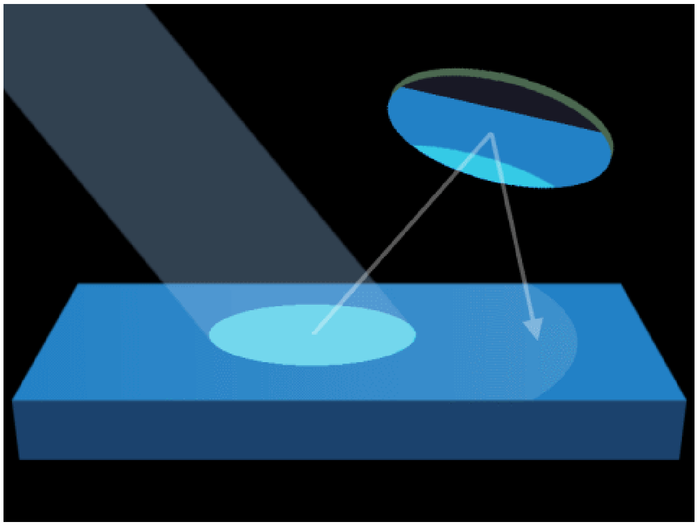
By multiple reflections, the interior is exposed to more rays from the sun, so the food gets much hotter than it'd get otherwise. The operant principle is akin to how stage lighting works.



In the zone where the beams intersect, the photon density is greater so more light is delivered. It may be obvious, but it's worth pointing out that the two beams pass through each other —

they do not clash like the Light Sabers in Star Wars movies. Worth noting too is that whereas more light makes the target brighter, i.e., increases the amount of light being reflected, it also increases the amount being absorbed, thus heating the target. Which of course is how a solar oven works.

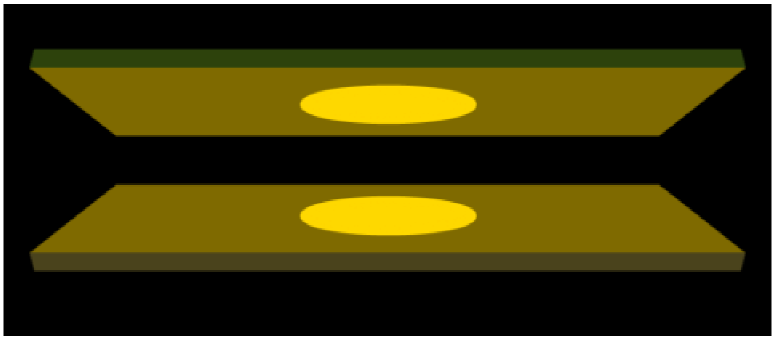
Now, you've been told that terrestrial infrared is re-radiated back to the earth's surface and heats it. So let's test this notion by turning a spotlight off and seeing if we can mimic a second spotlight with a mirror, which will provide re-radiation. After all, a mirror has no idea of what it's reflecting — it could be visible light or infrared 'heat rays.' It makes no difference to a mirror.



Well, is it any surprise that nothing happens? Reflecting light back to the bright spot doesn't make it brighter. (You can try this at home on a wall.)

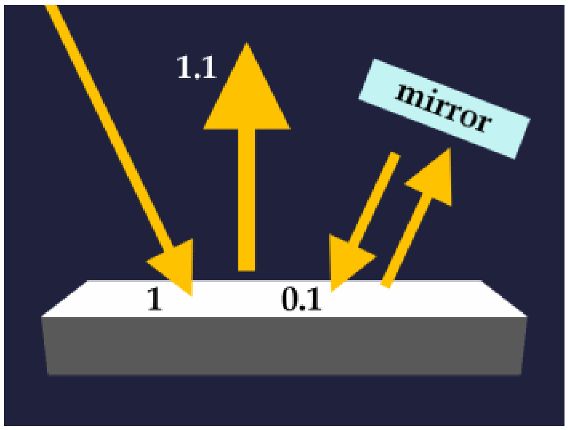
Close as you hold the mirror to the bright spot, there's no effect. You might notice, though, that offsetting the mirror a bit can illuminate a zone that's in shadow. In this case, light reflected from the bright spot brightens a darker area. But the mirror cannot make the bright spot brighter.

The lesson I draw from this real-world example is that radiant energy can only light something that has ***less*** radiance. Brighter illuminates darker. You can get a sense of this by omitting the spotlight altogether and just imagining a surface radiating light on its own. Holding a perfect mirror directly above it, you'd see something like this:



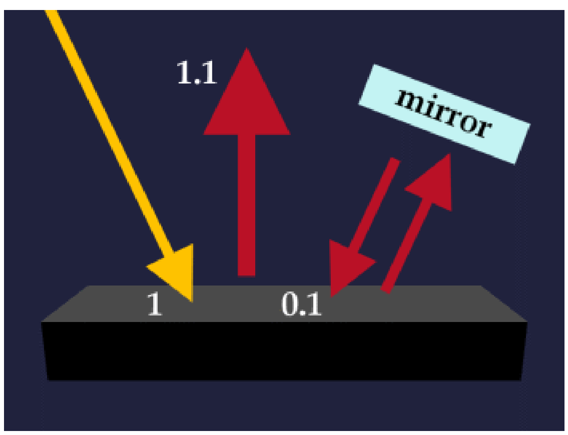
There's no difference between them, and it shouldn't need explaining that the mirror image is ***not*** illuminating the very object that it's reflecting. But if the mirror isn't illuminating that object, ***the mirror isn't heating it either***. To do that, the image in the mirror would have to be brighter, like the blazing image a solar oven provides. The same principle applies to conductive heat transfer: Higher temperature matter heats lower temperature matter. At equal temperature no heating occurs. Directing an object's own radiance back to it, then, doesn't do a thing and cannot make it more radiant. But from this proceeds another ramification.

A perfectly reflective 'white body' is the opposite of a black-body. It can't be heated by radiative means. So suppose a mirror reflects a tiny amount of energy onto a white body.



In the scenario above, 1 unit of light hits the surface yet a total of 1.1 units are reflected, thus creating energy out of nothing and contradicting the 1st law of thermodynamics. Since this is impossible, it demonstrates that second-hand reflected light cannot be regarded as part of the object's "radiation budget." Indeed, this reflection is only the object's own radiance in another guise, not an additional source of light.

Now consider a black-body.



Without the mirror, a perfectly absorptive/emissive object would release one unit of light in response to one unit of irradiance. But if the black-body absorbs another tenth from the mirror, then it's compelled to emit 1.1 units in all. To repeat, this is impossible. So this indicates that re-radiated infrared cannot be regarded as part of an absorbing object's "radiation budget" either, or else the 1st law is wrong. This re-radiated infrared is only the object's own thermal emission in another guise, not an additional source of heat.

Putting these results together, one must conclude that "back-radiation" of any sort, whether visible or infrared, will simply not ***show up*** on an external radiometer because it represents no "extra" energy in the first place and it induces no illuminative or thermal effect. Re-radiated energy is neither reflected ***nor*** absorbed by a surface, therefore, because either outcome would point to additional energy that would register on a detector, signaling that more radiant energy is leaving the system than what is going in.

Summing up, re-radiated light has as much chance of enhancing surface energy as you have of standing in a bucket and lifting it off the ground. In other words, it can't be done. Following a principle similar to conductive heat transfer, and also similar to electrons needing a lower electrical potential in order to move, radiant energy can exert an effect only on something that is radiating less. Radiant energy is like water; it can only flow downhill.

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